

glycol n-propyl ether, propylene glycol isopropyl ether, propylene glycol n-butyl ether, propylene glycol isobutyl ether, dipropylene glycol methyl ether, dipropylene glycol ethyl ether, dipropylene glycol n-propyl ether, dipropylene glycol isopropyl ether, dipropylene glycol n-butyl ether, dipropylene glycol isobutyl ether, tripropylene glycol methyl ether, tripropylene glycol ethyl ether, tripropylene glycol n-propyl ether, and tripropylene glycol isopropyl ether.

20. (Amended) The ink composition of claim 16, wherein said polalkylene glycol alkyl ethers comprise at least one polypropylene glycol n-butyl ether having fewer than three oxypropylene groups.

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REMARKS

Claims 1-20 are pending. By the Office Action, the specification and claims 1, 3-8, 10 and 16-20 are objected to and claims 1-20 are rejected under §103. By this Amendment, the Abstract, the specification and claims 1-10 and 16-20 are amended. No new matter is added. In view of the foregoing amendments and the following remarks, reconsideration and allowance are respectfully requested.

The attached Appendix includes marked-up copies of the substitute specification (37 C.F.R. §1.125(b)(2)) and each rewritten claim (37 C.F.R. §1.121(c)(1)(ii)).

**I. Objection to Specification**

The Office Action objects to the specification due to informalities. Specifically, the Office Action requests correction of the terms "alkylethers", "glycol-n-butyl", and "glycol-n-propyl". Applicants attach hereto a substitute specification containing the requested corrections, along with a marked-up copy showing the amendments. Applicants further amend the term "alkylether" to "alkyl ether".

Accordingly, Applicants respectfully request reconsideration and withdrawal of the objection.

**II. Claim Objection**

The Office Action objects to claims 1, 3-8 and 16-20 due to informalities. As stated above, the Office Action requests correction of the terms "alkylethers", "glycol-n-butyl", and "glycol-n-propyl". Applicants amend claims 1, 3-8 and 16-20 as requested, and amend claims 9-10 as well. Accordingly, Applicants respectfully request reconsideration and withdrawal of the objection.

**III. Claim Rejection under §103****A. Yatake '389 in view of Goto**

The Office Action rejects claims 1-15 and 19 under 35 U.S.C. §103(a) over U.S. Patent No. 6,004,389 to Yatake ("Yatake '389") in view of U.S. Patent No. 6,048,914 to Goto et al. ("Goto"). Applicants respectfully traverse the rejection.

Applicants disclose a water-based printing ink. More specifically, the instant specification describes a water-based ink composition that allows the user to print on plain paper rather than on printing sheets designed specifically for ink-jet printing. The problems typically associated with conventional ink compositions is that they are prone to color bleeding when the ink is slow to permeate through the printing medium and is slow to dry. The claimed combination of water, a coloring agent, and at least two different types of polyoxyalkylene glycol alkyl ethers, wherein at least one of the polyoxyalkylene glycol alkyl ethers is polypropylene glycol n-butyl ether having three or more oxypropylenes in its molecule, unexpectedly provides an ink with reduced color bleeding, even on plain paper.

Applicants describe and claim an ink composition in which, a first type of polyoxyalkylene glycol alkyl ether, one that is not polypropylene glycol n-butyl ether, is dispersed uniformly in the printing ink composition and improves the ability of the printing ink composition to permeate through the paper and to dry slightly at a uniform rate through the ink composition. In addition, a second type of glycol ether, that is polypropylene glycol n-butyl ether, is localized at the interface between the ink composition and the air, and

increases the initial permeation rate of the ink composition at the time when the ink composition is attached to the printing medium. As a result, the combination of the polyoxyalkylene glycol alkyl ether and the polypropylene glycol n-butyl ether, due to their structural similarity, helps drops of the ink composition permeate from their surface to their core into the printing medium continuously and smoothly. It therefore becomes possible to inhibit color bleeding effectively in the printing ink composition. Yatake '389 and Goto, alone or in combination, do not teach or suggest such an ink composition.

Yatake '389 describes an ink composition with reportedly reduced bleeding or feathering that includes a pigment, a glycol ether and water (col. 3, lines 12-13). The Yatake '389 glycol ether apparently includes, inter alia, propylene glycol mono n-butyl ether and dipropylene glycol mono n-butyl ether (col. 3, lines 15-21). As acknowledged in the Office Action, Yatake '389 does not disclose polypropylene glycol n-butyl ether having three or more oxypropylenes, as claimed. The Office Action relies on Goto to teach the allegedly art recognized equivalence of propylene, dipropylene and tripropylene glycol monobutyl ether in an ink composition. The Office Action concludes that it would have been obvious to one of ordinary skill in the art to substitute tripropylene glycol monobutyl ether in the Yatake '389 ink to arrive at the claimed ink composition. Applicants respectfully disagree with this conclusion.

Goto describes an ink formulation designed for writing on non-absorbing surfaces, such as resin, glass and metal, while retaining excellent drawn line sticking properties. Goto further describes the ink as water and alcohol resistant (Abstract). As such, the ink maintains resistance to many solvents and makes it possible to write on surfaces having a releasing property or a repellent property (col. 2, lines 55-60). The teachings of Goto provide an ink composition designed not to write on paper but to write on typically non-absorbing surfaces, such as adhesive tape, paraffin paper, plastics, ceramics and metal (col. 5, lines 23-25).

In addressing this particular situation, Goto describes an ink composition containing "a solvent having specific physical properties and a specific ink composition" (col. 2, lines 65-67). Goto further teaches that the solvent must have particular SP value and vapor pressure properties (col. 4, line 14-17 and col. 5, lines 26-29). As a result, the solvents are selected from a group consisting of glycol ethers, glycol ether acetates, esters and derivatives thereof (col. 5, line 29 to col. 6, line 7). Goto further includes high amounts of solvent in its ink, i.e., an amount of 20 to 97% by weight (col. 6, lines 11-16).

Although Goto includes propylene, dipropylene and tripropylene glycol butyl ethers among its particular class of solvents, the reference contains nothing that would have taught or suggested that tripropylene glycol n-butyl, or any other polypropylene glycol n-butyl ether having three or more oxypropylenes in its molecule, is equivalent to the propylene and dipropylene glycol mono n-butyl ether in the Yatake '389 ink composition. Moreover, any possible suggestion of equivalence in Goto would have been limited to an ink composition directed toward writing on non-absorbing surfaces and resistant to water and alcohol solvents. One of ordinary skill in the art would find that the teachings of Goto are inapposite to Applicants' ink composition. One of ordinary skill in the art would not have looked to Goto for teaching that propylene, dipropylene and tripropylene glycol butyl ethers are equivalent to the glycol ethers described in the Yatake '389 ink composition. Accordingly, contrary to the position of the Office Action, it would not have been obvious to combine the reference teachings of Yatake '389 and Goto.

Furthermore, Yatake '389 fails to teach or suggest the substitution of tripropylene glycol butyl ether in its ink composition. Yatake '389 does not teach a broad genus of glycol ethers but instead actually refers specifically to four particular glycol ethers, namely, the group consisting of diethylene glycol mono n-butyl ether, triethylene glycol mono n-butyl ether, propylene glycol mono n-butyl ether, and dipropylene glycol mono n-butyl ether (col. 3, lines 15-21). Moreover, Yatake '389 teaches away from the substitution of any of these

specific glycol ethers. Yatake '389 states that the addition of the four glycol ethers can effectively prevent bleeding and feathering but that "other glycol ethers than the above four glycol ethers cannot reduce or can only slightly reduce the bleeding or feathering." (Col. 4, lines 7-11). Thus, Yatake '389 does not teach or suggest, and in fact teaches away from, any alleged art recognized equivalence between tripropylene glycol butyl ether and the four disclosed glycol ethers. The substitution as suggested by the Office Action would not have been obvious to one of ordinary skill in the art, particularly in view of the express disclosure of Yatake '389.

In view of the foregoing comments, Applicants respectfully request reconsideration and withdrawal of the rejection.

**B. Yatake '770 in view of Goto**

The Office Action rejects claims 1-9, 11, 12, 15-18 and 20 under 35 U.S.C. §103(a) over U.S. Patent No. 5,560,770 to Yatake ("Yatake '770") in view of Goto. Applicants respectfully traverse the rejection.

Much as described in the above paragraphs regarding Yatake '389, Yatake '770 teaches an ink composition including propylene glycol mono n-butyl ether and/or dipropylene glycol mono n-butyl ether and a second water soluble glycol ether. As recognized by the Office Action, Yatake '770 fails to teach polypropylene glycol n-butyl ether having three or more oxypropylenes. However, Goto does not remedy the deficient teachings of Yatake '770. As detailed above, one of ordinary skill in the art would not have looked to Goto for teaching or suggesting the equivalence of polypropylene, dipolypropylene and tripolypropylene glycol n-butyl ether in the Yatake '770 ink composition. Goto limits its composition to solvents having particular physical properties that are specifically suited to an ink for writing on typically non-absorbing surfaces. Furthermore, Yatake '770 fails to provide any teaching or suggestion to substitute tripolypropylene glycol n-butyl ether in its ink composition.

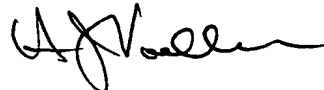
Thus, it would not have been obvious to one of ordinary skill in the art to combine the teachings of Yatake '770 and Goto and arrive at the ink composition as claimed. Applicants respectfully request reconsideration and allowance of the rejection.

**IV. Conclusion**

In view of the foregoing amendments and remarks, Applicants respectfully submit that this application is in condition for allowance. Favorable consideration and prompt allowance are earnestly solicited.

Should the Examiner believe that anything further is desirable in order to place this application in better condition for allowance, the Examiner is requested to contact Applicants' representative at the telephone number listed below.

Respectfully submitted,



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**Attachments:**

Appendix  
Substitute Specification  
Marked-up copy of Specification

Date: June 18, 2003

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<p>DEPOSIT ACCOUNT USE AUTHORIZATION Please grant any extension necessary for entry; Charge any fee due to our Deposit Account No. 15-0461</p>
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## APPENDIX

**Changes to Abstract:**

The following is a marked-up version of the amended Abstract.

## ABSTRACT OF THE DISCLOSURE

A printing ink composition is provided comprising water, a coloring agent and at least two types of polyoxyalkylene glycol ~~alkylethers~~alkyl ethers each having at least one oxyalkylene in its polyoxyalkylene group, wherein at least one of the polyoxyalkylene glycol ~~alkylethers~~alkyl ethers is polypropylene glycol-~~n-butyl~~glycol n-butyl ether having three or more oxypropylenes in its molecule. This printing ink composition can inhibit color bleeding not only on a printing medium specifically designed for ink-jet printing but also on plain paper.

**Changes to Specification:**

A Substitute Specification, and a marked up version thereof showing all changes to the specification of record, are attached in accordance with 37 C.F.R. 1.125(b)(2).

**Changes to Claims:**

The following is a marked-up version of the amended claims:

1. (Amended) An ink composition, comprising:  
water;  
a coloring agent; and  
at least two different types of polyoxyalkylene glycol ~~alkylethers~~alkyl ethers each having at least one oxyalkylene in a polyoxyalkylene group,  
wherein at least one of the polyoxyalkylene glycol ~~alkylethers~~alkyl ethers is polypropylene glycol-~~n-butyl~~glycol n-butyl ether having three or more oxypropylenes in its molecule.
3. (Amended) The ink composition as claimed in claim 1, comprising 10 to 98 % by weight of the water, 0.1 to 20 % by weight of the coloring agent, and 0.1 to 20 % by

weight of the polyoxyalkylene glycol ~~alkylethers~~salkyl ethers, based on the total weight of the ink composition.

4. (Amended) The ink composition as claimed in claim 3, comprising 30 to 97 % by weight of the water, 0.3 to 15 % by weight of the coloring agent, and 0.3 to 15 % by weight of the polyoxyalkylene glycol ~~alkylethers~~salkyl ethers, based on the total weight of the ink composition.

5. (Amended) The ink composition as claimed in claim 4, comprising 40 to 95 % by weight of the water, 0.5 to 15 % by weight of the coloring agent, and 0.5 to 10 % by weight of the polyoxyalkylene glycol ~~alkylethers~~salkyl ethers, based on the total weight of the ink composition.

6. (Amended) The ink composition as claimed in claim 1, comprising 1 to 80 % by weight of the polyoxyalkylene glycol ~~alkylethers~~salkyl ethers other than the polypropylene glycol ~~n-butylglycol n-butyl~~ ether having three or more oxypropylenes in the molecule, based on a total weight of the polyoxyalkylene glycol ~~alkylethers~~salkyl ethers.

7. (Amended) The ink composition as claimed in claim 6, comprising 3 to 60 % by weight of the polyoxyalkylene glycol ~~alkylethers~~salkyl ethers other than the polypropylene glycol ~~n-butylglycol n-butyl~~ ether having three or more oxypropylenes in the molecule, based on a total weight of the polyoxyalkylene glycol ~~alkylethers~~salkyl ethers.

8. (Amended) The ink composition as claimed in claim 7, comprising 5 to 50 % by weight of the polyoxyalkylene glycol ~~alkylethers~~salkyl ethers other than the polypropylene glycol ~~n-butylglycol n-butyl~~ ether having three or more oxypropylenes in the molecule, based on the total weight of the polyoxyalkylene glycol ~~alkylethers~~salkyl ethers.

9. (Amended) The ink composition as claimed in claim 1, wherein the polypropylene glycol ~~n-butylglycol n-butyl~~ ether having three or more oxypropylenes in the



molecule is tripropylene glycol ~~n-butylglycol n-butyl~~ ether, tetrapropylene glycol ~~n-butylglycol n-butyl~~ ether, or pentapropylene glycol ~~n-butylglycol n-butyl~~ ether.

10. (Amended) The ink composition as claimed in claim 1, wherein less than all of the polyoxyalkylene glycol ~~alkylethersalkyl ethers~~ is polypropylene glycol ~~n-butylglycol n-butyl~~ ether having three or more oxypropylenes in its molecule.

16. (Amended) The ink composition of claim 1, wherein said polyalkylene glycol ~~alkylethersalkyl ethers~~ comprise at least one of a polyethylene glycol ~~alkyletheralkyl ether~~ having at least one oxyethylene group and a polypropylene glycol ~~alkyletheralkyl ether~~ having at least one oxypropylene group.

17. (Amended) The ink composition of claim 16, wherein said polyalkylene glycol ~~alkylethersalkyl ethers~~ comprise at least one polyethylene glycol ~~alkyletheralkyl ether~~ selected from the group consisting of ethylene glycol methyl ether, ethylene glycol ethyl ether, ethylene glycol ~~n-propylglycol n-propyl~~ ether, ethylene glycol isopropyl ether, ethylene glycol ~~n-butylglycol n-butyl~~ ether, ethylene glycol isobutyl ether, diethylene glycol methyl ether, diethylene glycol ethyl ether, diethylene glycol ~~n-propylglycol n-propyl~~ ether, diethylene glycol isopropyl ether, diethylene glycol ~~n-butylglycol n-butyl~~ ether, diethylene glycol isobutyl ether, triethylene glycol methyl ether, triethylene glycol ethyl ether, triethylene glycol ~~n-propylglycol n-propyl~~ ether, triethylene glycol isopropyl ether, triethylene glycol ~~n-butylglycol n-butyl~~ ether and triethylene glycol isobutyl ether.

18. (Amended) The ink composition of claim 16, wherein said polyalkylene glycol ~~alkylethersalkyl ethers~~ comprise at least one polyethylene glycol ~~n-butylglycol n-butyl~~ ether having at least one oxyethylene group.

19. (Amended) The ink composition of claim 16, wherein said polyalkylene glycol ~~alkylethersalkyl ethers~~ comprise at least one polypropylene glycol ~~alkyletheralkyl ether~~ selected from the group consisting of propylene glycol methyl ether, propylene glycol

ethyl ether, propylene glycol ~~n-propyl~~ glycol n-propyl ether, propylene glycol isopropyl ether, propylene glycol ~~n-butyl~~ glycol n-butyl ether, propylene glycol isobutyl ether, dipropylene glycol methyl ether, dipropylene glycol ethyl ether, dipropylene glycol ~~n-propyl~~ glycol n-propyl ether, dipropylene glycol isopropyl ether, dipropylene glycol ~~n-butyl~~ glycol n-butyl ether, dipropylene glycol isobutyl ether, tripropylene glycol methyl ether, tripropylene glycol ethyl ether, tripropylene glycol ~~n-propyl~~ glycol n-propyl ether, and tripropylene glycol isopropyl ether.

20. (Amended) The ink composition of claim 16, wherein said polalkylene glycol ~~alkylethers~~ alkyl ethers comprise at least one polypropylene glycol ~~n-butyl~~ glycol n-butyl ether having fewer than three oxypropylene groups.